

SOFT X-RAY LASER BASED MOIRÉ DEFLECTOMETRY OF DENSE PLASMAS

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Soft X-ray laser based Moiré deflectometry has been shown to be a viable and useful diagnostic for probing dense plasmas relevant in the inertial confinement fusion (ICF) process. Collisionally pumped soft x-ray lasers are thereby used as reliable radiation sources which provide unique intensity and coherence characteristics in the soft X-ray region in order to overcome the adverse effects of absorption and refraction of the probe beam in the plasma.

We will present results obtained from Moiré deflectometry experiments carried out at the ILE Gekko XII laser facility where the Neon-like Germanium X-ray laser with line emission at 196 Å has been used to probe laser produced plasmas created from 100 μm thick CH targets. Besides a high brightness the X-ray laser exhibits small beam divergence (< 3 mrad) and short pulse duration of about 80 ps. The wavelength of two heater beams for preproducing the plasma was 351 nm (3ω). Additional efforts have been made to verify a predrilling effect by means of a 1ω (1.053 μm) pulse. The imaging system had a magnification of 12 and consisted of a 74 cm radius of curvature multilayer mirror as well as a variety of multilayer bandpass filters to reduce the self emission of the plasma.

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